

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 239 591 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
02.05.2003 Bulletin 2003/18

(51) Int Cl.7: **H03K 19/0185**, H03K 19/003

(43) Date of publication A2:
11.09.2002 Bulletin 2002/37

(21) Application number: **02004689.2**

(22) Date of filing: **31.03.1998**

(84) Designated Contracting States:
DE FR NL

(30) Priority: **31.03.1997 JP 7938597**

(62) Document number(s) of the earlier application(s) in
accordance with Art. 76 EPC:
98105843.1 / 0 869 616

(71) Applicant: **Oki Electric Industry Company,
Limited
Tokyo 105 (JP)**

(72) Inventors:
• **Kawano, Harumi
Miyazaki-shi, Miyazaki-ken (JP)**
• **Sushihara, Akihiro
Miyazaki-shi, Miyazaki-ken (JP)**

(74) Representative: **Betten & Resch
Patentanwälte,
Theatinerstrasse 8
80333 München (DE)**

(54) **Input circuit for an integrated circuit**

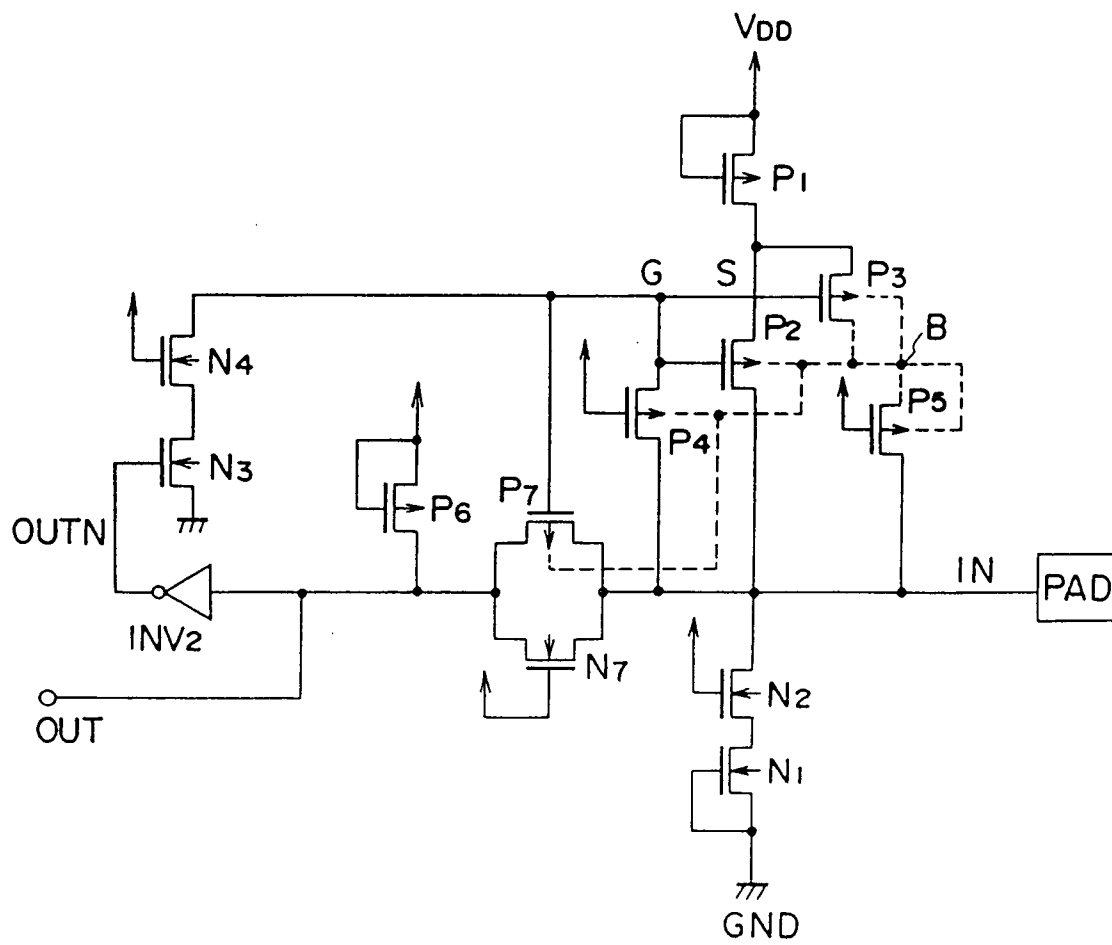
(57) An input circuit comprising:

a first type field effect transistor (P₁) having a channel of one conductivity, having a gate connected to a first power supply (V_{DD}), having a first electrode connected said first power supply and having a second electrode connected a first node (S),
a second type field effect transistor (P₂) having a channel of one conductivity, having a gate connected to a second node (G), having a first electrode connected to said first node, having a second electrode connected to a third node (IN), having a substrate connected to a fourth node (B) which is floating,
a third type field effect transistor (P₄) having a channel of one conductivity, having a gate connected to said first power supply, having a first electrode connected to said second node (G), having a second electrode connected to said third node (IN) and having a substrate connected to said fourth node (B),
a fourth type field effect transistor (N₇) having a channel of the opposite conductivity, having a gate connected to said first power supply, having a first electrode connected to said third node (IN) and having a second electrode connected to a fifth node

(OUT),
a fifth type field effect transistor (P₇) having a channel of one conductivity, having a gate connected said second node (G), having a first electrode connected to said fifth node (OUT), having a second electrode connected to said third node (IN) and having a substrate connected to said fourth node (B),
an inverter means (INV₂) having an input terminal connected to said fifth node (OUT) and an output terminal connected to a sixth node (OUTN),
a sixth type field effect transistor (N₃) having a channel of the opposite conductivity, having a gate connected to said sixth node (OUTN), having a first electrode connected to a second power supply and having a second electrode connected to a seventh node, and
a seventh type field effect transistor (N₄) having a channel of the opposite conductivity, having a gate connected to said first power supply, having a first electrode connected to said seventh node and having a second electrode connected to said second node (G).

EP 1 239 591 A3

FIG. 14





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 00 4689

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 06, 31 July 1995 (1995-07-31) & JP 07 079150 A (NEC IC MICROCOMPUT SYST LTD), 20 March 1995 (1995-03-20) * abstract *	1	H03K19/0185 H03K19/003
A	--- PATENT ABSTRACTS OF JAPAN vol. 015, no. 419 (E-1126), 24 October 1991 (1991-10-24) & JP 03 175727 A (NEC CORP), 30 July 1991 (1991-07-30) * abstract *	1	
A	--- "OVERVOLTAGE PROTECTION CIRCUIT" IBM TECHNICAL DISCLOSURE BULLETIN, IBM CORP. NEW YORK, US, vol. 30, no. 12, 1 May 1988 (1988-05-01), pages 96-97, XP002017155 ISSN: 0018-8689 * the whole document *	1	
A	--- US 5 381 059 A (DOUGLAS KENNETH R) 10 January 1995 (1995-01-10) * column 5, line 4 - column 9, line 68; figures 3,4,7 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H03K
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		27 February 2003	Feuer, F
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 00 4689

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-02-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 07079150	A	20-03-1995	JP 2944373 B2	06-09-1999
JP 03175727	A	30-07-1991	NONE	
US 5381059	A	10-01-1995	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82